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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/929,728 | 08/14/2001 | Mamoru Soga | 5077-000064 | 9034 |

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| EXAMINER | |
|---|---|
| SHOSHO, CALLIE E | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1714 | 4 |

DATE MAILED: 03/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 09/929,728 | Applicant(s) SOGA ET AL. | |
|---|---|---|---|
| | Examiner Callie E. Shosho | Art Unit 1714 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 1-8 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-8 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-4 are each recite that the "outer portion" of the star block copolymer is hydrophilic. The scope of the claims is confusing because it is not clear what is meant by "outer portion". What part of the star block copolymer does this refer to? Does this refer to the outer portion of the core of the star block copolymer, the outer portion of the arms of the star block copolymer, the arms themselves, etc.? What is considered the outer portion and what is considered the inner portion of the star block copolymer?

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spinelli (U.S. 5,772,741) in view of Coca et al. (U.S. 6,336,966) and Hosmer (U.S. 6,436,178).

Spinelli discloses ink jet ink comprising water, pigment, dispersant, and nonaqueous, i.e. oil-soluble, dye. The ink has surface tension of 30-70 dyne/cm and viscosity of 1-10 cP. There is also disclosed an ink jet printer which comprises the above ink. Such printer would intrinsically possess ink cartridge to store the ink (col.3, lines 12 and 59, col.4, lines 58-65, and col.5, lines 36-42).

The difference between Spinelli and the present claimed invention is the requirement in the claims of (a) amphiphilic star block copolymer and (b) humectant and penetrant.

Spinelli discloses the use of block copolymer dispersant, however, there is no disclosure of amphiphilic star block copolymer as presently claimed.

Coca et al. disclose the use of dispersant, suitable for use in inks, which is star block copolymer which possesses arms comprising both hydrophobic and hydrophilic chain segments wherein the hydrophilic portion is located in the outer portion of the arm. The motivation for using such dispersant is to produce stable dispersion wherein the dispersant is effective in preventing the pigments from re-agglomerating or settling out of the dispersion (col.1, lines 12-14 and 41-45, col.2, lines 2-8, col.3, lines 48-53 and 59-65, and col.19, line 4).

In light of the motivation for using star block copolymer disclosed by Coca et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such star block copolymer as the dispersant in the ink of Spinelli in order to produce a stable ink, and thereby arrive at the claimed invention.

With respect to difference (b), Hosmer, which is drawn to ink jet inks, disclose the use of penetrant in order to allow the ink to penetrate the surface of the paper and increase the rate of drying of the ink (col.3, lines 59-64) and humectant in order to reduce the rate of evaporation of water in the ink to minimize clogging (col.3, lines 10-15).

In light of the motivation for using penetrant and humectant disclosed by Hosmer as described above, it therefore would have been obvious to one of ordinary skill in the art to use penetrant and humectant in the ink of Spinelli in order to produce ink with increased drying rate which does not clog the printer nozzles, and thereby arrive at the claimed invention.

6. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1008634 in view of Hosmer (U.S. 6,436,178).

EP 1008634 discloses aqueous ink jet ink comprising solvent dye, i.e. oil-soluble dye, and amphiphilic star block copolymer which comprises arms obtained from both hydrophilic and hydrophobic monomers. The ink possesses surface tension of 20-70 dyne/cm and viscosity of 1-10 cP. There is also disclosed an ink jet printer which comprises the above ink. Such printer would intrinsically possess ink cartridge to store the ink (col.2, lines 5-6 and 34-37 col.3, line 9, col.3, line 52-col.4, line 1, and col.4, lines 8-12 and 36-45).

The difference between EP 1008634 and the present claimed invention is the requirement in the claims that (a) the star block copolymer possesses outer hydrophilic portion and (b) penetrant and humectant.

With respect to difference (a), although there is no explicit disclosure that the star block copolymer possesses outer hydrophilic portion, on the one hand, given that the star comprises the hydrophilic portion in the arms, which are the outer portion of the star block copolymer (core is inner portion of the star), it is clear that EP 1008634 meets the requirement that the star block copolymer possesses outer hydrophilic portion as presently claimed. On the other hand, given that EP 1008634 discloses that the functional groups of the hydrophilic portion of the star block copolymer are used to solubilize or disperse the star block copolymer, it therefore would have been obvious to one of ordinary skill in the art to include the functional groups on the outer portion of the star block copolymer in order to control the solubility of the star polymer, and thereby arrive at the claimed invention.

With respect to difference (b), Hosmer, which is drawn to ink jet inks, discloses the use of penetrant in order to allow the ink to penetrate the surface of the paper and increase the rate of drying of the ink (col.3, lines 59-64) and humectant in order to reduce the rate of evaporation of water in the ink to minimize clogging (col.3, lines 10-15).

In light of the motivation for using penetrant and humectant disclosed by Hosmer as described above, it therefore would have been obvious to one of ordinary skill in the art to use penetrant and humectant in the ink of EP 1008634 in order to produce ink with increased drying rate which does not clog the printer nozzles, and thereby arrive at the claimed invention.

7. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spinelli (U.S. 5,772,741) in view of Hosmer (U.S. 6,436,178) and either Phan et al. (U.S. 6,420,479) or Petersen et al. (U.S. 6,201,099).

Spinelli discloses ink jet ink comprising water, pigment, dispersant, and nonaqueous, i.e. oil-soluble, dye. The ink has surface tension of 30-70 dyne/cm and viscosity of 1-10 cP. There is also disclosed an ink jet printer which comprises the above ink. Such printer would intrinsically possess ink cartridge to store the ink (col.3, lines 12 and 59, col.4, lines 58-65, and col.5, lines 36-42).

The difference between Spinelli and the present claimed invention is the requirement in the claims of (a) amphiphilic heteroarm star copolymer and (b) humectant and penetrant.

With respect to difference (a), Spinelli discloses the addition of acrylic or non-acrylic polymers to improve various properties of the ink composition.

Phan et al. disclose heteroarm star polymer in order to produce composition with improved mechanical properties, film strength, block resistance, and abrasion resistance (col.1, lines 7-10 and col.2, lines 48-49).

Alternatively, Petersen et al. disclose the use of heteroarm star polymer wherein the motivation for using such polymer is that it possesses narrow molecular weight distribution and exhibits low viscosity at low molecular weight due to its compact structure and high viscosity at high molecular weight due to its extensive entanglement (col.1, lines 6-18 and 39-44, col.2, lines 9-12, and col.4, lines 36-39).

In light of the motivation for using heteroarm star polymer disclosed by Phan et al. or Petersen et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such polymer in the ink of Spinelli in order to produce ink with improved mechanical properties, film strength, block resistance, and abrasion resistance, or alternatively, to produce ink with suitable viscosity for printing, and thereby arrive at the claimed invention.

With respect to difference (b), Hosmer, which is drawn to ink jet inks, discloses the use of penetrant in order to allow the ink to penetrate the surface of the paper and increase the rate of drying of the ink (col.3, lines 59-64) and humectant in order to reduce the rate of evaporation of water in the ink to minimize clogging (col.3, lines 10-15).

In light of the motivation for using penetrant and humectant disclosed by Hosmer as described above, it therefore would have been obvious to one of ordinary skill in the art to use penetrant and humectant in the ink of Spinelli in order to produce ink with increased drying rate which does not clog the printer nozzles, and thereby arrive at the claimed invention.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Schoenberg et al. (U.S. 6,150,468) disclose heteroarm star polymer used as an emulsion stabilizer in emulsion polymerization.

Spinelli et al. (U.S. 5,371,147) disclose the use of star polymer, block copolymer, or macromonomer in contact lenses.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Callie E. Shosho whose telephone number is 703-305-0208. The examiner can normally be reached on Monday-Friday (6:30-4:00) Alternate Fridays Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 703-306-2777. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Callie E. Shosho
Examiner
Art Unit 1714

CS
March 14, 2003